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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,905	05/09/2001	Thomas Sonderman	2000.044700	3951

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EXAMINER	
JARRETT, RYAN A	

ART UNIT	PAPER NUMBER
2125	

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/851,905	SONDERMAN ET AL.	
	Examiner	Art Unit	
	Ryan A. Jarrett	2125	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-11,13-21,23-41 and 43-61* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-11,13-21,23-41 and 43-61* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

5.00

DETAILED ACTION

Response to Arguments

1. In view of the appeal brief filed on 9/10/04, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 3-11, 13-21, 23-41, and 43-61 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to

reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claims 1, 11, 21, 31, 41, 51, and 61, applicant recites "using deposition rate sensor data for performing said modeling". However, Examiner has been unable to find any disclosure of "deposition rate sensors" in the original specification. Applicant has cited page 9, lines 14-22 of the specification as clearly supporting the term "deposition rate sensor data". This passage makes reference to "sensor data", but nowhere does it explicitly or implicitly disclose that the "sensor data" is "deposition rate sensor data".

Claims 3-10 depend from claim 1, claims 13-20 depend from claim 11, claims 23-30 depend from claim 21, claims 32-40 depend from claim 31, claims 43-50 depend from claim 41, and claims 52-60 depend from claim 51 and thus incorporate the same deficiencies.

This claimed feature was added to the claims in an amendment filed 5/6/03.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 3-11, 13-21, 23-41, and 43-61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1, 11, 21, 31, 41, 51, and 61, it is recited that the deposition rate is determined by modeling a dependence of the deposition rate on a target life of

the sputter target. It is also recited that deposition rate sensors are used to determine the deposition rate. Thus, it is unclear how the deposition rate is actually determined. Is it determined empirically based on a modeled dependence to the sputter target life? Or is it determined using actual deposition rate sensors? This ambiguity most likely stems from the fact that there is no support in the specification for using deposition rate sensors.

Claims 3-10 depend from claim 1, claims 13-20 depend from claim 11, claims 23-30 depend from claim 21, claims 32-40 depend from claim 31, claims 43-50 depend from claim 41, and claims 52-60 depend from claim 51 and thus incorporate the same deficiencies.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. As best understood, claims 1, 5, 6, 9-11, 15, 16, 19-21, 25, 26, 29-32, 35, 36, 39-41, 45, 46, 49-52, 55, 56, 59, and 60 are rejected under 35 U.S.C. 102(b) as being anticipated by Turner U.S. Patent No. 4,1666,783. Turner discloses a method, program storage device, computer, and system comprising: monitoring consumption of a sputter target to determine a deposition rate (using deposition rate sensors) of a metal layer during metal deposition processing using the sputter target (e.g., col. 1 lines 34-37, col.

3 line 64 – col. 4 line 7, col. 3 lines 16-19: *"The computer determines the deposition rate and the initially required power in view of the elapsed usage of the particular cathode and controls the system accordingly"*); modeling a dependence of the deposition rate on the deposition plasma power (e.g., col. 3 lines 23-32: *"The deposition rate, power dissipation and the aging characteristic are expressed by an empirically obtained function specific to the cathode material which is stored in the computer"*); and applying the deposition rate model to modify the metal deposition processing to form the metal layer to have or approach a desired thickness (e.g., col. 3 lines 12-16, col. 3 lines 32-36);

wherein monitoring the consumption of the sputter target to determine the deposition rate of the metal layer during the metal deposition processing comprises modeling a dependence of the deposition rate on a target life of the sputter target (e.g., col. 3 lines 23-32, col. 3 lines 16-19: *"The computer determines the deposition rate and the initially required power in view of the elapsed usage of the particular cathode and controls the system accordingly"*);

wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power to form the metal layer to have the desired thickness (e.g., col. 3 lines 32-36);

wherein modeling the dependence of the deposition rate on the deposition plasma power (implied) and target life (Fig. 1) of the sputter target comprises fitting previously collected metal deposition processing data using at least one of polynomial

curve fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting (Fig. 1 illustrates the modeling of the dependence of deposition rate on sputter target life using least-squares fitting – it is implied that the dependence of deposition rate on deposition plasma power is modeled in a similar fashion);

wherein modeling the dependence of the deposition rate on the target life of the sputter target comprises modeling the dependence of the deposition rate on target lives of a plurality of previously processed sputter targets (e.g., col. 2 lines 10-13).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. As best understood, claims 3, 4, 7, 8, 13, 14, 17, 18, 23, 24, 27, 28, 33, 34, 37, 38, 43, 44, 47, 48, 53, 54, 57, 58, and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner in view of Sullivan et al. U.S. Patent No. 6,217,720. Turner does not specifically disclose "modeling a dependence of the deposition rate on the deposition time or inverting the deposition rate model to determine the deposition time to form the metal layer having a desired thickness." However, Sullivan et al. discloses a multi-layer reactive sputtering method comprising modeling the dependence of a

deposition rate on a deposition time and determining the time required to form a metal layer having the desired thickness (e.g. Fig. 5, col. 7 line 50 – col. 8 line 10, col. 8 line 60 – col. 9 line 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Sullivan et al. with the system of Turner since Sullivan et al. teaches that modeling a dependence of a sputtering deposition rate on the deposition time can assist in optimizing a desired layer thickness using a relatively high deposition rate and short deposition time.

10. As best understood, claims 9, 10, 19, 20, 29, 30, 39, 40, 49, 50, 59, and 60 are *additionally* rejected under 35 U.S.C. 103(a) as being unpatentable over ***Turner*** as applied to claims 1, 2, 11, 12, 21, 22, 31, 32, 41, 42, 51, and 52 above. ***Turner*** does disclose modeling the dependence of deposition rate on deposition power as noted above. However, ***Turner*** does not explicitly disclose that the dependence of deposition rate on deposition power is modeled using the curve-fitting techniques of the claimed invention.

However, ***Turner*** does disclose in Fig. 1 modeling the dependence of deposition rate on sputter target life using curve-fitting techniques. Additionally, it is well known in the art to use the various curve-fitting techniques of the claimed invention to model historical data. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify ***Turner*** to include the capability to model the dependence of deposition rate on deposition power using the various curve-fitting techniques since ***Turner*** already discloses curve-fitting as a means to ***accurately***

model the dependence of deposition rate on target life, and also since the multiple curve-fitting techniques of the claimed invention are well-known in the art.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan A. Jarrett whose telephone number is (571) 272-3742. The examiner can normally be reached on 10:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ryan A. Jarrett
Examiner
Art Unit 2125

5/18/05

LEO PICARD
SUPERVISORY PATENT EXAMINER
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